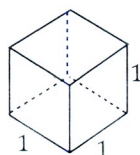


Volume of Prisms and Cylinders

How full can you go? How full can you go?

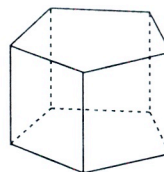
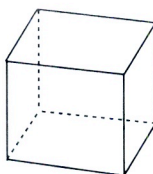
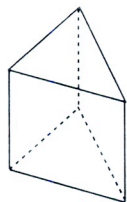
I think that line is supposed to be something different... Anyway, volume is important. You use it every day when you have your cereal, or you shampoo your hair, because it is the measure of how much stuff you can fit into something. Volume is measured in cubic units. Oh look, there goes one now!...



This is 1 unit x 1 unit X unit. So this is $1u^3$.

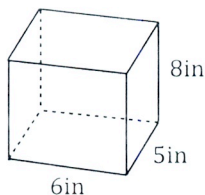
As you can see, this measurement is in three dimensions. If you multiply the length and width of the base, and then the height you get a cubic unit. Now we know we can fill this cube with $1u^3$ of milk, or cereal or shampoo or water or... whatever you want.

Prism: A prism is simply a three dimensional shape that has the same polygon on the top and the bottom. Like these....



To find the volume of a prism you must find the area of the base and multiply it by the height. Use the formula $V=Bh$ the capital "B" means "the area of the base" Let's check out an example...

Ex 1. Find the volume.



Step 1. Make sure all the dimensions are present and find the area of the base.

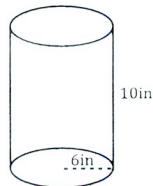
$$\begin{aligned} B &= bh \\ B &= 6 * 5 \\ B &= 30 \end{aligned}$$

Step 2. Find the volume.

$$\begin{aligned} V &= Bh \\ V &= 30 * 8 \\ V &= 240 \text{ in}^3 \end{aligned}$$

Notice step 1 says "make sure all dimensions are present." Sometimes you might have to solve for a dimension by using the Pythagorean theorem, trigonometry, or some other theorem or property.

A cylinder is a prism that has a circle as its base instead of a polygon. Its volume is also $V=Bh$ except the B for a circle is πr^2 giving us $V=\pi r^2 h$. Let's look at examples of this one too.

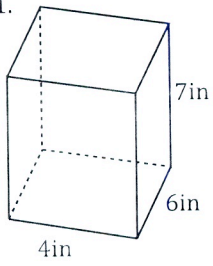


$$V = r^2 h$$

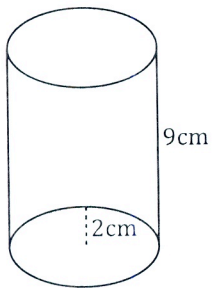
$$\begin{aligned} V &= \pi (6^2) 10 \\ V &= \pi 36 * 10 \\ V &= 360\pi \\ V &\approx 1130.97 \text{ in}^3 \end{aligned}$$

Calculate the volume of each figure...

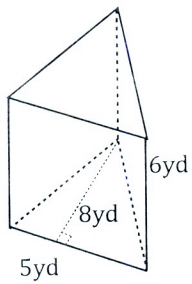
1.



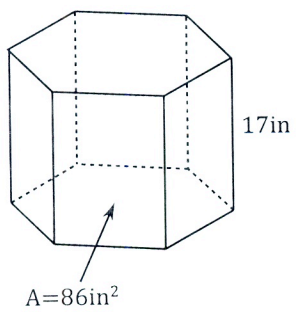
3.



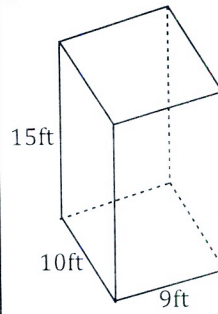
5.



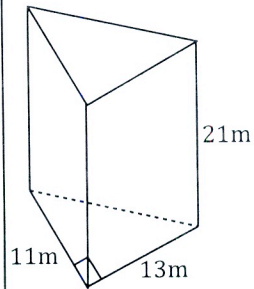
6.



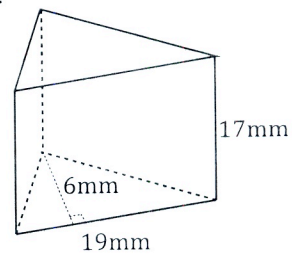
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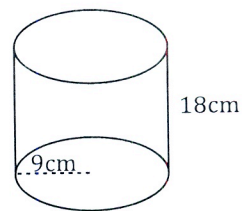
4.



5.



7.

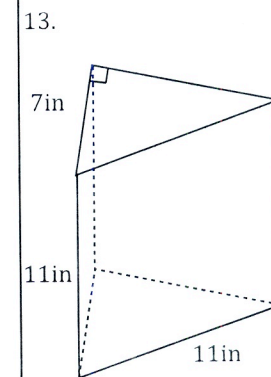
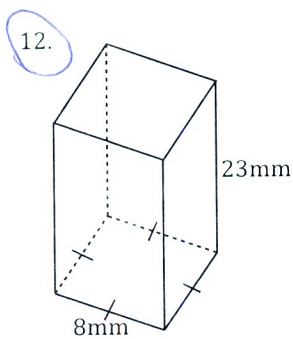
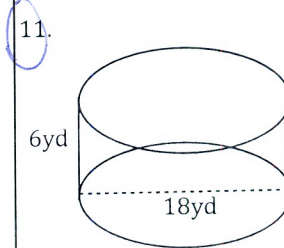
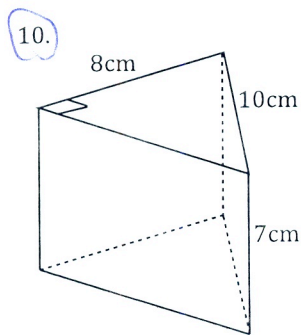
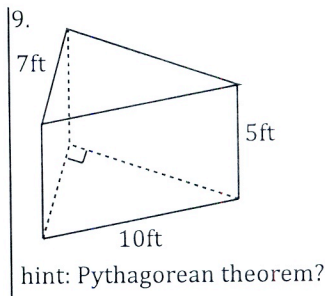
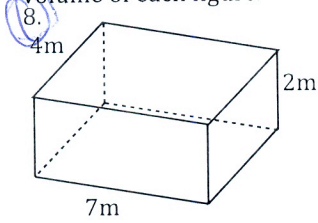


64

Bubble all the correct answers from above. Don't bubble incorrect answers.

- ☐ 156
 ☐ 1462
 ☐ 113.1
 ☐ 256
 ☐ 168
 ☐ 120
 ☐ 1607
 ☐ 986
 ☐ 1501.5
 ☐ 1405
 ☐ 1350
 ☐ 4580.44
 ☐ 969
 ☐ 4685.33

Find any missing dimensions and then find the volume of each figure.



Bubble all the correct answers from above. Don't bubble incorrect answers.

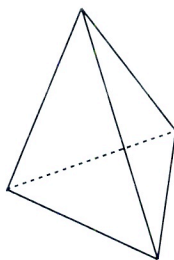
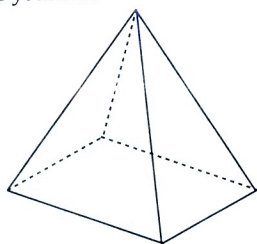
- ☐ 56
 ☐ 987
 ☐ 1,472
 ☐ 136
 ☐ 1,526.81
 ☐ 7.78
 ☐ 124.95
 ☐ 8.9
 ☐ 326.92
 ☐ 168

Volume of Pyramids and Cones

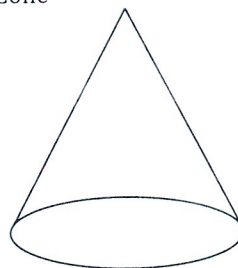
Anyone for a trip to Egypt for an ice cream cone? No? So it's just me then...

Pyramids and cones are pretty much like prisms and cylinders except instead of having a polygon or circle on the top AND the bottom, they just have one on the bottom and then meet in a point on the top, like these....

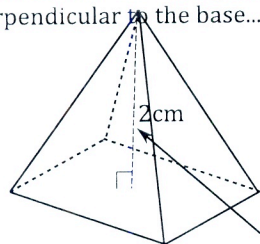
Pyramids



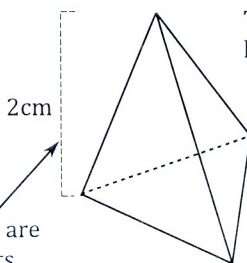
Cone



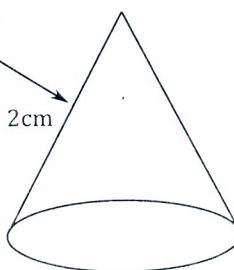
To find the volume of a pyramid the formula is $V = \frac{1}{3}(Bh)$, and for a cone it's $V = \frac{1}{3}\pi r^2$. Why? Well there are several really fun exercises you can do to show why, but they require folding and cutting paper or pouring water and sand into things and would be a bit hard to explain. Basically, you can fit 3 cones or pyramids into a cylinder or prism of the same dimensions. For now, take my word for it.... One tricky thing with cones and pyramids is the height. The height is always perpendicular to the base...



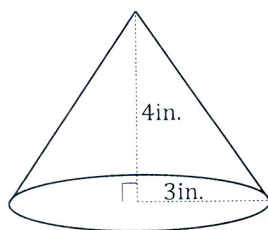
These are heights.



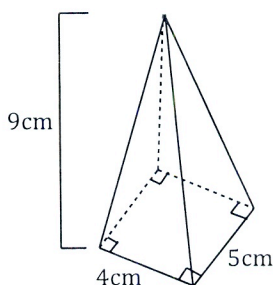
This is not a height!



Find the volume.

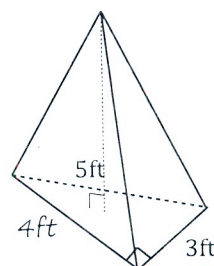


$$\begin{aligned} V &= \frac{1}{3}\pi r^2 h \\ V &= \frac{1}{3}\pi (3^2) 4 \\ V &= \frac{1}{3}\pi 9 \cdot 4 \\ V &= \frac{1}{3}(36\pi) \\ V &= 12\pi \\ V &\approx 40.84 \text{ in}^3 \end{aligned}$$



$$\begin{aligned} B &= bh \\ B &= 4 \cdot 5 \\ B &= 20 \\ V &= \frac{1}{3}(Bh) \\ V &= \frac{1}{3}(20 \cdot 9) \\ V &= \frac{1}{3}(180) = 60 \text{ cm}^2 \end{aligned}$$

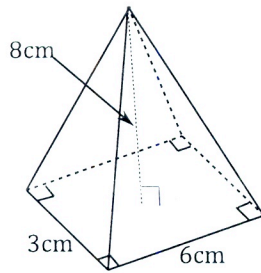
3-4-5 right triangle scale factor 1. $1 \cdot 4 = 4$



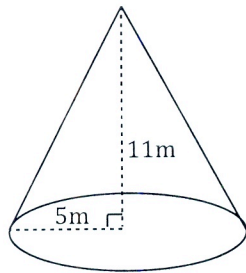
$$\begin{aligned} B &= \frac{1}{2}bh \\ B &= \frac{1}{2}(3 \cdot 4) \\ B &= \frac{1}{2}(12) \\ B &= 6 \\ V &= \frac{1}{3}(Bh) \\ V &= \frac{1}{3}(6 \cdot 5) \\ V &= \frac{1}{3}(15) = 5 \text{ ft}^3 \end{aligned}$$

Calculate the volume of each figure...

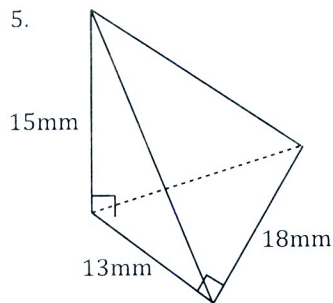
1.



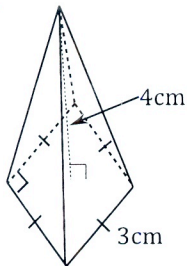
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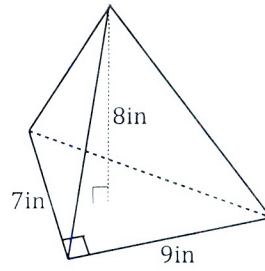
5.



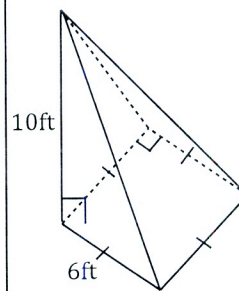
7.



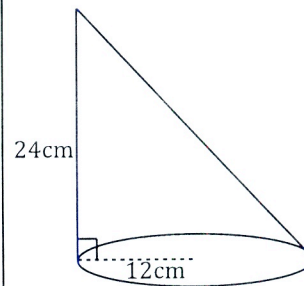
2.



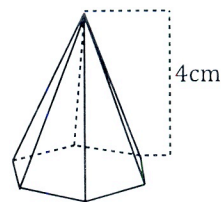
4.



6.



8. $B = 35\text{cm}^2$

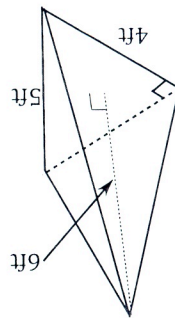


69

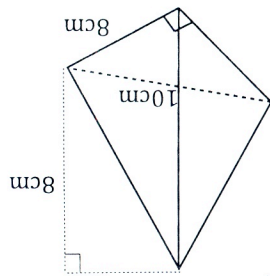
Bubble all the correct answers from above. Don't bubble incorrect answers.

- ☐ 120
 ☐ 2025
 ☐ 224
 ☐ 25.67
 ☐ 297.33
 ☐ 49
 ☐ 84
 ☐ 48
 ☐ 287.99
 ☐ 46.67
 ☐ 12
 ☐ 130
 ☐ 585
 ☐ 3619.11

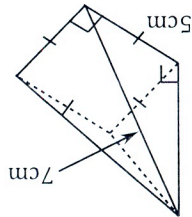
Solve for any missing dimensions, then find the volume of each figure...



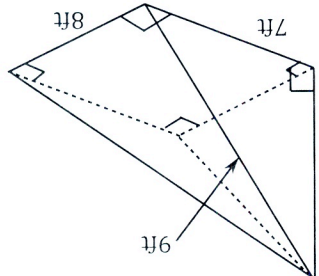
9.



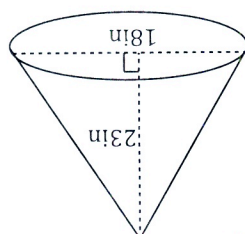
11.



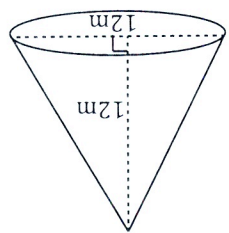
13.



10.



12.



14.

- ☐ 64
- ☐ 320
- ☐ 12
- ☐ 108.5
- ☐ 452.39
- ☐ 4.9
- ☐ 40.83
- ☐ 7803.72
- ☐ 168
- ☐ 1950.93

Bubble all the correct answers from above. Don't bubble incorrect answers.